

3-4: The student will demonstrate an understanding of the changes in matter that are caused by heat.

Key Concepts

Forms of Matter: solids, liquids, gases

Properties: observable and measurable

Changes of State: melting, freezing, condensing, boiling, evaporating

Heat Movement: conductors, insulators

Sources of Heat: stoves, heaters, toasters, sun

Heat Production: rubbing, burning, using electricity

Supporting Content Web Sites

Chem4Kids.com

http://www.chem4kids.com/files/matter_states.html

The five main states of matter are listed, with pictures, and a description is given of conditions necessary for a change of phase.

3-4.1, 3-4.2

Chem4Kids.com

http://www.chem4kids.com/files/matter_changes.html

Changes of state between solid, liquid and gas are explained. Freezing point, boiling point and melting point are discussed.

3-4.2

Chem4Kids.com

http://www.chem4kids.com/files/matter_evap.html

Evaporation and the relationship between the rate of evaporation and gas pressure are explained.

3-4.2

Revise Wise Science

http://www.bbc.co.uk/schools/revisewise/science/materials/07b_act.shtml

Conductors and insulators of heat are explained and pictured.

3-4.3

Think Quest

<http://library.thinkquest.org/J001539/matter.html>

Matter is explained in simple terms. A student can click on “solids”, “liquids”, or “gases” for an explanation and representative picture.

3-4.1

Suggested Literature

Frost, H. (2000). *Water as a Gas*. Minnesota: Pebble Books/Capstone Press.
ISBN 0-7368-0412-9 Lexile Level 310

The properties of water as a gas are explained.

3-4.1

Morgan, B. (2003). *Liquids*. Michigan: Blackbirch Press.

ISBN 1-41030-084-6

Properties of different kinds of liquids, and freezing and melting, are discussed.

3-4.1, 3-4.2

Robinson, F. (1995). *Solid, Liquid, or Gas?* New York: Children's Press.

ISBN 0-516-46041-2

Lexile Level 430

The states of matter are discussed.

3-4.1

Royston, A. (2003). *Conductors and Insulators*. Illinois: Heinemann Library.

ISBN 1-40340-851-3

Conductors and insulators of heat and electricity are introduced.

3-4.3

Stille, D.R. (2006). *Physical Change: Reshaping Matter*. Minnesota: Compass Point Books.

ISBN 0-7565-1257-3

Physical properties, physical changes, states of matter and the effect of heat are explained.

3-4.2

Trumbauer, L. (2004). *All About Heat*. New York: Children's Press.

ISBN 0-516-25846-X

Lexile Level 320

Sources and properties of heat are explained.

3-4.4

Suggested Streamline Video

Properties of Matter, Part I

Solids, Liquids, and Gases

ETV Streamline SC

Characteristics of solids, liquids, and gases are given.

15:48 to 16:16

3-4.1

Changes in the Properties of Matter: Physical and Chemical Conductivity

ETV Streamline SC

Electrical, heat, and sound conductivity are discussed. Fast forward through the electrical conductivity part of this clip. The heat conductivity is well-aligned to the indicator. The sound conductivity can apply to 3-5.5.

6:08 to 9:46

3-4.3

Matter and Its Properties: Exploring Phases of Matter

ETV Streamline SC

The phases of matter and change between phases are explored. Melting, boiling, evaporation, condensation and freezing are shown and explained.

0:00 to 21:39

3-4.2

Career Connections

Welder

A welder permanently joins pieces of metal with metal filler, using heat and/or pressure. Welders join parts being manufactured, they build structures and repair broken or cracked parts, according to specifications.

Job Related Skills, Interests and Values

- using and maintaining tools, material handling equipment and welding equipment
- reading and interpreting blueprints
- acquiring thorough knowledge of arc, gas and resistance welding theory
- laying out, cutting and forming metals to specifications
- preparing the work site
- fitting sub-assemblies and assemblies together and preparing assemblies for welding
- welding using shielded metal arc welding, gas metal arc welding, gas tungsten arc welding, flux core or metal core arc welding, submerged arc welding and plasma arc welding processes
- carrying out special processes such as welding studs and brazing
- ensuring quality of product/process before, during and after welding